Selection Guide: HVAC Verification Tools (as of August 31, 2017)

Installation Verification Tools: Total System

Equipment — Performance Monitoring

24/7 Hardware and Sensors

	Target Audience	Type	Features	Benefits	Capability	Examples
After Market Onboard Sensors and Monitoring	Consumers, Contractors	Monitoring system (10 add-on sensors) installed by a qualified HVAC technician and tracked via Cloud.	Sensors send data when HVAC system is turned on and can remotely monitor component problems and enable contractors to proactively address issues (when an alert is generated) before the issue results in a system fault or failure.	System performance monitoring provides a path for a proactive approach to addressing system faults and failures and can help optimize system performance. Fault data sent directly to contractor in real time improves response time and reduces transaction cost of repairs.	HVAC System Analysis, Long Term Monitoring	Comfort Guard
OEM Onboard Sensors and Monitoring	Consumers, Contractors	Monitoring system built into equipment.			Long Term Monitoring	York Affinity, Trane Nexia

24/7 SAAS Data Analytics and Firmware

	Target Audience	Type	Features	Benefits	Capability	Examples
Software as a Service (SAAS)	Utilities, Energy Retailers, Home Service Providers	Software platform that monitors HVAC systems for optimization and demand response.	Software solution that aggregates data to determine if there is a fault with an HVAC system. It also connects with smart thermostats (to minimize energy consumption) and can provide demand response integration.	Integrates HVAC performance monitoring and smart thermostat control for enhanced demand response capabilities.	Smart Controls	Eco Factor
Smart Thermostats	Utilities, Energy Retailers, Home Service Providers, Consumers	An intelligent Wi-Fi enabled thermostat that automatically adjusts heating and cooling temperature settings for optimal performance.	Common features include: learning occupant habits and preferences to automate schedule; providing HVAC energy use data and derived insights/feedback to occupants; and remote control access through Wi-Fi and smart devices.	Leverage analytical algorithms and pattern recognition (and connect with many emerging IoT devices) to provide convenience, comfort, insight, control, as well as opportunities to manage the reliability and efficiency of a home's heating and cooling remotely through a smartphone.	Smart Controls	Nest, Cor, Ecobee
Wi-Fi Thermostats	Utilities, Energy Retailers, Home Service Providers, Consumers	A Wi-Fi enabled thermostat that gives users remote access to control their heating and cooling (and fan) settings.	Programmable thermostat with remote access capabilities through Wi-Fi and smart devices. Limited capability to send automated notifications via a phone app when conditions migrate outside of normal ranges.	Ability to remotely monitor and adjust a home's heating and cooling temperature. May provide opportunities for optimizing the energy efficiency of a home's HVAC system.	Smart Controls	Sensi
Indoor Air Quality (IAQ) Monitors	Consumers, Contractors	Stand-alone monitoring device to continually monitor and measure aspects of IAQ, and data log those measurements over a period of time.	The range of measurements varies, but typically include measuring PM10, PM2.5, total VOCs, CO2, temperature, and humidity (none yet measure CO). Some models are IoT and thermostat ready (that is, can be configured to turn on the fan of an HVAC system to filter air when the device measures poor IAQ).	Monitoring tool that provides insight into a home's IAQ. Some models connect with emerging IoT devices and may provide a path to a proactive and streamlined approach to improving IAQ.	Indoor Air Quality Monitoring	Foobot, Awair

Commissioning & Verification

Hand Tools & System Analysis

	Target Audience	Type	Features	Benefits	Capability	Example Products
System Analysis Hardware	Contractors, Utilities	Intelligent digital and wireless manifold, gauges, or probes that perform extended system analysis and integrate with smart phones.	Wireless measurement tool that leverages mobile phone capabilities to measure data points in real-time for fault analysis and offer improvement solutions on system performance.	Wireless measurements (of temperatures and pressures) streamline the process for gathering system diagnostics. System performance calculations and analytics streamline and enhance in-field improvement solutions. And, smart phone integration (through an app) further leverages wireless capabilities to streamline data reporting for the user.	Smart Service Tool	iManifold, HG3
Refrigeration: Digital Gauges & Manifolds	Contractors	Digital manifold.	Leverages digital technology to determine superheat and sub-cooling and record measurements over time. There are many models on the market, with more continually being developed.	Streamlined and more accurate approach to charging a refrigeration system directly by superheat or sub-cooling. With built-in temperature and pressure charts, eliminates the need to manually read a dial and then calculate superheat or sub-cooling, which can reduce refrigerant charging errors and cause system performance issues.	Smart Service Tool	Testo, Fieldpiece
Airflow Tools	Contractors	Tools to measure airflow directly or indirectly.	There are various tools in the market, each with different features and technical capabilities, but the purpose of each is to measure airflow.	Accurately quantifies total system airflow in a single measurement.	Airflow Direct Measurement	True FlowPlate
System Analysis Software	Utilities, Contractors	Software platform that verifies system performance.	Most act as a repository for capturing field data input by the user and then calculates system performance.	Typically these serve as a quality assurance documentation system to capture diagnostics and system performance.	Extended Analysis	HVAC Save, CheckMe!

Design

Capacity, Load, & Design Calculation Tools

	Target Audience	Type	Features	Benefits	Capability	Example Products
ACCA Manual Software	Contractors (HVAC Designers)	Software, cloud, and web based load calculators for HVAC designers to generate Manual J reports.	Platforms approved by ACCA to generate Manual J reports and assist contractors in sizing (when coupled with Manual S) and selecting appropriate HVAC equipment.	Engineered solution to system design may ensure the most comfortable and energy efficient equipment selection.	Load Calculation	Wrightsoft
Sizing Apps	Contractors	Tablet and smart phone apps designed to provide speedy load calculations.	iOS and Android apps that are designed to perform quick load and capacity sizing calculations in sizing HVAC equipment.	Streamlined approach to sizing HVAC equipment and is more rigorous than rule-of-thumb approaches.	Load Calculation and Sizing Analysis	HVAC Buddy, HVAC Quick Load

Distribution System — Duct Distribution

In-Field Duct Diagnostic Tools

	Target Audience	Type	Features	Benefits	Capability	Example Products
System Analysis	Utilities, Contractors	Software platform that verifies duct contribution to system performance, including duct leakage and other distribution issues.	Most function as a repository for capturing field data input by hand and then calculates system performance metrics.	Typically used as a quality assurance documentation system to capture diagnostics and total system performance.	Distribution System Analysis	HVAC Save, CheckMe!, ComfortMaxx
Airflow Tools	Contractors	Tools to measure airflow in ducts and aid in the diagnosis of duct issues.	Tools that measure (and quantify) delivery temperatures and airflows to assist in locating problem duct runs and guide "test and balance" processes.	Ensures comfort and system efficiency; tools that directly measure airflow and/or duct leakage further enable a field technician interpret system performance and efficiency.	Airflow Direct Measurement	Capture Hood, Vane Anemometer